

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

MADHAV DATTA

Application No.: 10/776,076

Filed: February 10, 2004

For: **COPPER-CONTAINING C4  
BALL-LIMITTING METALLURGE  
STACK FOR ENHANCED RELIABILITY  
OF PACKAGED STRUCTURES AND  
METHOD OF MAKING SAME**

Art Group: 2813

Examiner: Thanhha S. Pham

**INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

In accordance with the duty of disclosure, enclosed is a copy of IDS Citation Form PTO/SB/08 or PTO-1449, together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). This IDS and IDS Citation Form are being submitted before the mailing of a final Office Action. It is respectfully requested that the cited references be considered and that the enclosed copy of PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s). Some or all of the references listed on the enclosed PTO/SB/08 were previously identified in the parent application (Application No. 09/961,034, filed September 21, 2001) and copies of the references were furnished at that time. Accordingly, per 37 CFR §1.98(d)(1) additional copies of those references are not submitted herewith.

The submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made in the subject application and is not to be construed as an admission that the information cited in this statement is material to patentability.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 5/16/05

Michael A. Bernadicou  
Michael A. Bernadicou, Reg. No. 35,934

12400 Wilshire Boulevard, 7th Floor  
Los Angeles, CA 90025

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Renee Coulman  
Renee Coulman

5/16/05  
Date

Substitute for form 1449A/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**(use as many sheets as necessary)**

Sheet	1	of	3
-------	---	----	---

**Complete if Known**

Application Number	10/776,076
Filing Date	February 10, 2004
First Named Inventor	Madhav Datta
Art Unit	2813
Examiner Name	Thanhha S. Pham
Attorney Docket Number	42P11468D

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date or Issue Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)			
		US-3,663,184	05-16-1972	Wood, John R., et al.	
		US-4,290,079	09-15-1981	Carpenter, Charles., et al.	
		US-4,360,142	11-23-1982	Carpenter, Charles., et al.	
		US-4,505,029	03-19-1985	Owyang, King et al.	
		US-5,648,686	07-15-1997	Hirano, Naohiko et al.	
		US-5,736,456	04-07-1998	Akram, S.	
		US-5,773,359	06-30-1998	Mitchell, Douglas G., et al.	
		US-5,885,891	03-23-1999	Miyata, Masahiro, et al.	
		US-6,111,321	08-29-2000	Agarwala, Birendra N.	
		US-6,222,279	04-24-2001	Mis. Joseph D., et al.	
		US-6,224,690	05-01-2001	Andricacos, Panayotis C., et al.	
		US-6,232,212	05-15-2001	Degani, Yinon et al.	
		US-6,348,730	02-19-2001	Yi, Sang-Don et al.	
		US-6,426,282	07-30-2002	Saigal, Dinesh, et al.	
		US-6,489,229	12-03-2002	Sheridan, Devin R., et al.	
		US-5,903,058	05-11-1999	Akram Salman	
		US-6,495,449	12-17-2002	Nguyen, Tue	
		US-6,130,170	10-10-2000	David et al.	
		US-5,384,283	01-24-1995	Gegenwarth et al.	
		US-5,492,235	02-10-1996	Crafts et al.	

## FOREIGN PATENT DOCUMENTS

[illegible]Examiner  
Signature

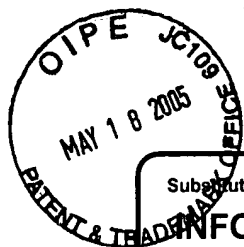
Date	
Considered	

\*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication.

<sup>1</sup>Applicant's unique citation designation number (optional). See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. Applicant is to place a check mark here if English language Translation is attached.

Based on PTO/SB/08A (08-03) as modified by Blakely, Solokoff, Taylor & Zafman (wlr) 08/11/2003.

Send To: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450



Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet

2

of

3

**Complete if Known**

Application Number	10/776,076
Filing Date	February 10, 2004
First Named Inventor	Madhav Datta
Art Unit	2813
Examiner Name	Thanhha S. Pham
Attorney Docket Number	42P11468D

**U.S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)			
		US-6,313,651	11-06-2001	Hembree et al.	
		US-5,137,845	08-11-1992	Lochon et al.	
		US-5,376,584	12-27-1994	Agarwala, Birendra N.	
		US-6,387,793	05-14-2002	Yap et al.	
		US-4,880,708	11-14-1989	Sharma et al.	
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>2</sup>
		Country Code <sup>3</sup> - Number <sup>4</sup> - Kind Code <sup>5</sup> (if known)				

Examiner  
SignatureDate  
Considered

\*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication.

<sup>1</sup>Applicant's unique citation designation number (optional). See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). For Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. Applicant is to place a check mark here if English language Translation is attached.

Based on PTO/SB/08A (08-03) as modified by Blakely, Solokoff, Taylor & Zafman (wlr) 08/11/2003.

Send To: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				<b>Complete if Known</b>	
				Application Number	10/776,076
				Filing Date	February 10, 2004
				First Named Inventor	Madhav Datta
				Art Unit	2813
				Examiner Name	Thanhha S. Pham
Sheet	3	of	3	Attorney Docket Number	42P11468D

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		T <sup>2</sup>
		"Chromium Copper Step Phasing", IBM Technical Disclosure Bulletin, (08/01/1977), pgs. 1005-1006		
		TUMMALA, RAO et al., "Microelectronics Packaging Handbook, Semiconductor Packaging", Part 2, 2nd Edition, (1997), pgs. 132-139		
		Annala, P., et al., "Electroplated Solder Alloys for Flip Chip Interconnections", Physica Scripta, T69, pp. 115-118 (1997)		
		Datta, M., et al. "Electrochemical Fabrication of Mechanically Robust PbSn C4 Interconnection", Journal of the Electrochemical Society, 142 (11), 7 p., (Nov 1995)		
		Honma, S., et al. "Effectiveness of Thin-Film Barrier Metals for Eutectic Solder Bumps", Microelectronics International, 14 (3), pp. 47-50 (Sept. 1997)		
		Liu, C.Y., et al., "Electron microscopy study of interfacial reaction between eutectic SnPb and Cu/Ni (v)/Al thin film metallization", Journal of Applied Physics, 86 (1), pp. 1-5 (Dec. 1999)		

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication.

<sup>1</sup>Applicant's unique citation designation number. Applicant is to place a check mark here if English language Translation is attached.

Based on PTO/SB/08B (08-03) as modified by Blakely, Solokoff, Taylor & Zafman (wlr) 08/11/2003.  
Send To: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450